

Claims

1. A power amplifier system using as an
amplifying element a Schottky barrier gate metal
semiconductor field effect transistor ("MESFET") with
5 a source grounded for receiving a drain bias voltage
and a forward gate bias voltage of zero or a low
potential as supplied from a unipolar power supply and
for amplifying an input signal superposed with said
gate bias voltage to output an amplified signal
10 indicative of a change in drain current, characterized
in that

said MESFET permits, upon application of a
forward direct current (DC) gate voltage to a gate
terminal with a source terminal grounded, the DC gate
15 voltage to be greater than or equal in value to 0.65
volt (V), said DC gate voltage causing a gate current
value per gate width of 100 micrometers (μm) to go
beyond 100 microamperes (μA).

2. The power amplifier system as recited in
20 claim 1, characterized in that said MESFET is a MESFET
of shallow depression type or enhancement type.

3. The power amplifier system, characterized in
that said MESFET has a channel region comprised of a
compound semiconductive material of direct transition
25 type.

4. The power amplifier system as recited in any one of the preceding claims 1 to 3, characterized in that a circuit for supplying said gate bias voltage is equipped with a ripple filtering capacitor.

5 5. The power amplifier system as recited in claim 4, characterized in that said ripple filtering capacitor is provided outside of a semiconductor substrate with said MESFET formed thereon.

10 6. The power amplifier system as recited in any one of the preceding claims 1 to 5, characterized in that a layer made from an alloy of a metal constituting said gate electrode and semiconductor constituting said channel region is formed at an interface between the gate electrode and channel
15 region of said MESFET.

7. The power amplifier system as recited in claim 6, characterized in that said metal is greater in work function than tungsten silicides.

20 8. The power amplifier system as recited in claim 7, characterized in that said metal is selected from the group consisting of platinum (Pt) and palladium (Pd).

25 9. The power amplifier system as recited in any one of the preceding claims 1 to 8, characterized in that said MESFET is formed separately per

semiconductor substrate and that said MESFET and a passive element are arranged in a way independent of each other.

10. The power amplifier system as recited in
5 any one of the preceding claims 1 to 8, characterized in that said MESFET and a passive element for use in making up amplifier circuitry are formed on a single semiconductor substrate.

11. The power amplifier system as recited in
10 any one of the preceding claims 1 to 8, characterized in that said MESFET and a passive element for use in making up amplifier circuitry plus output matching circuitry of said amplification circuitry are formed together on a single semiconductor substrate.

12. A mobile communications terminal device
15 having a power amplifier circuit including a compound semiconductor MESFET for use as an active element for amplifying and outputting a high frequency signal, the MESFET having a source coupled to ground, a unipolar
20 power supply for supplying said compound semiconductor MESFET with a drain bias voltage and a gate bias voltage, and an output matching circuit of said power amplifier circuit, characterized in that

said compound semiconductor MESFET permits, upon
25 application of a forward direct current (DC) gate

voltage to a gate terminal with its source terminal grounded, the DC gate voltage to be greater than or equal in value to 0.65 volt (V), said DC gate voltage causing a gate current value per gate width of 100 micrometers (μm) to go beyond 100 microamperes (μA).
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13. The mobile communications terminal device as recited in claim 12, characterized in that a circuit for supplying said gate bias voltage is associated with a ripple filter capacitor as connected thereto and provided outside of a semiconductor substrate with said MESFET formed thereon.
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14. The mobile communications terminal device as recited in claim 12 or 13, characterized in that said compound semiconductor MESFET has a gate electrode and a channel region made of compound semiconductor defining therebetween an interface with a layer made from an alloy of a metal and said compound semiconductor formed thereat, said metal being selected from the group consisting of platinum (Pt) and palladium (Pd).
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